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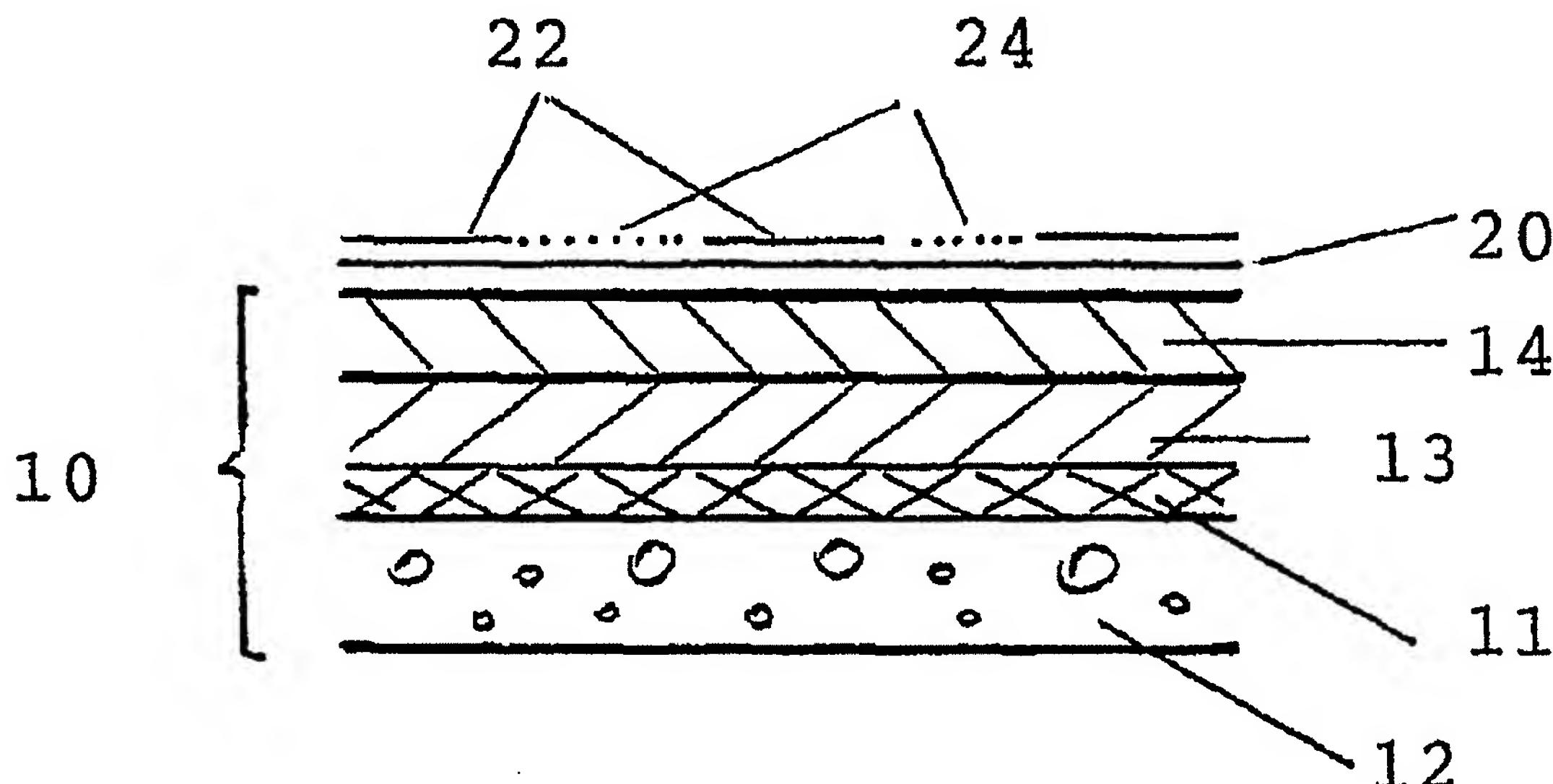
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(54) Titre : PROCEDE DE PRODUCTION DE REVETEMENTS DE SOLS ET DE MURS A EFFET DE DECOR DE BRILLANCE DIFFERENTIEL ET PRODUITS OBTENUS
(54) Title: METHOD FOR PRODUCING FLOOR-FINISH AND WALL-FINISH WITH DIFFERENTIAL GLOSS DECORATION EFFECT AND RESULTING PRODUCTS



(57) Abrégé/Abstract:

The invention concerns a method for floor-finish and wall-finish with differential gloss decoration effect characterised in that it consists in producing an undercoat (10) and then producing gloss effects by differentiated deposits (20, 22, 24) without total overlap of at least two topcoat type protective layers with different characteristics, in similar or different register, with the undercoat.

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(71) Déposant (pour tous les États désignés sauf US) : TAR-KETT SOMMER S.A. [FR/FR]; Rue de l'Egalité, 2, F-92748 Nanterre Cédex (FR).

(72) Inventeurs; et

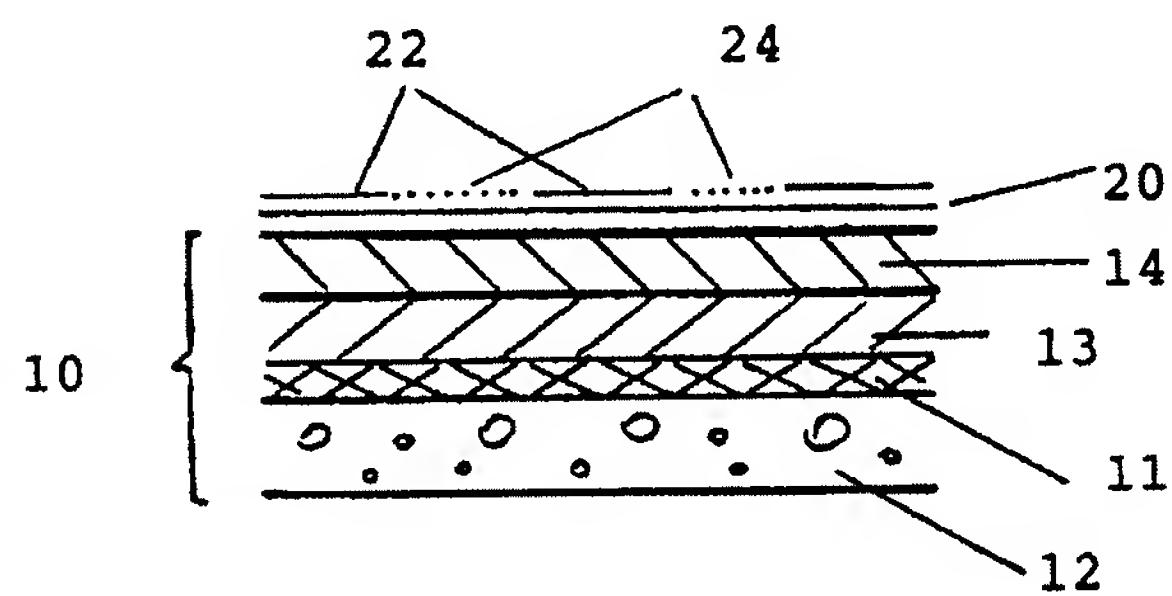
(75) Inventeurs/Déposants (pour US seulement) : DAO VIET, Dung [BE/BE]; 18, Trixhe aux Minières, B-4920 Aywaille (BE). HOUBA, Gabriel [LU/LU]; 13, Burrebeirig, L-9676 Noertrange (LU).

En ce qui concerne les codes à deux lettres et autres abréviations, se référer aux "Notes explicatives relatives aux codes et abréviations" figurant au début de chaque numéro ordinaire de la Gazette du PCT.

(54) Title: METHOD FOR PRODUCING FLOOR-FINISH AND WALL-FINISH WITH DIFFERENTIAL GLOSS DECORATION EFFECT AND RESULTING PRODUCTS

(54) Titre : PROCÉDÉ DE PRODUCTION DE REVÊTEMENTS DE SOLS ET DE MURS À EFFET DE DÉCOR DE BRILLANCE DIFFÉRENTIEL ET PRODUITS OBTENUS

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brillance par des dépôts différenciés (20, 22, 24) sans recouvrement total d'au moins deux couches de protection de type "topcoat" de caractéristiques différentes, en registre ou non, avec le décor sous-jacent.

(57) Abstract: The invention concerns a method for floor-finish and wall-finish with differential gloss decoration effect characterised in that it consists in producing an undercoat (10) and then producing gloss effects by differentiated deposits (20, 22, 24) without total overlap of at least two topcoat type protective layers with different characteristics, in similar or different register, with the undercoat.

(57) Abrégé : Procédé de production de revêtement de sols et de murs à effet de décor de brillance différentiel caractérisé en ce qu'on produit un revêtement sous-jacent (10) et qu'on réalise ensuite des effets de

METHOD FOR PRODUCING FLOOR AND WALL COVERINGS
5 WITH A DIFFERENTIAL GLOSS DECORATION EFFECT,
 AND RESULTING PRODUCTS

Subject of the invention

The present invention relates to an improved method
10 for producing floor and wall coverings with contrasted, mat
and gloss decoration effects, which may be combined with
other decoration effects (designs, embossment, texture or
structure) that are standard for this type of product.

The invention also covers the products resulting from
15 this method.

Technical background

In order to satisfy customer demands, floor coverings,
in particular floor coverings of hard-wearing type, are
20 constantly changing both as regards the decoration, i.e.
essentially the design and the embossment (mechanical or
chemical graining) and as regards the intrinsic wear
qualities (wear resistance, resilience, etc.).

The desired effects are of different nature but
25 generally involve an accordance (or register) between the
design, the embossment and any other optical effects.

In this latter respect, the tendency is to create,
preferably in accordance with a design and an embossment,
local effects that highlight specific areas relative to
30 others by means of differences in gloss.

To obtain mat and glossy effects, the state of the art
usually consists in locally graining the product by
mechanical means with grainers that give different matting
effects.

35 The current performance requirement in terms of wear

and resistance to chemical attack requires the application of specific surface treatments with performance qualities that are higher than those of the base products. Unfortunately, the application of such surface layers causes the matting effects obtained by mechanical graining to disappear.

Furthermore, the existing technologies for applying surface treatments or layers, especially onto very wide lengths, should be taken into account. The solutions proposed should not, however, involve downgrading of the existing material and prohibitive investments in new equipment.

Document WO 99/39042 describes floor and wall covering products with a contrasted gloss effect, containing at least one layer with wear-resistant particles, such as alumina.

The technique described involves the use of a curable resin such as a urethane-based resin, depending on the presence or absence of said particles.

This method requires at least one chemical graining operation and involves a partial overlapping layer applied with a roller on the embossments of the product and having a difference in gloss to create a contrasted effect. A second solution recommended consists in applying a continuous "topcoat" protective layer and a discontinuous "topcoat" layer to the embossments.

This technique of applying a coating to embossments, also known as "kiss-coating", is particularly difficult to implement.

Poor adjustment of the equipment may lead to a variation in the thickness of the product, which may lead either to a loss of contact, or to crushing the embossment, and, in both cases, prevents the desired effect from being obtained.

A person skilled in the art can immediately see that

this technique only allows the production of two grades of gloss.

Aims of the invention

5 The present invention aims to avoid the above-mentioned drawbacks. In particular, it aims to propose an economical method that is easy to implement and which enables to produce a covering with multi-contrast effect and good wear resistance by a differential application of
10 different grades or qualities of "topcoat".

Other characteristics, details and advantages of the present invention will appear in the following description, of a preferred embodiment of the invention.

15 Characteristic elements of the invention

According to the invention, an underlying floor and wall covering is first produced according to the standard production techniques that are well known to those skilled in the art, and gloss effects are then achieved by
20 differential application without total overlapping of at least two protective layers of the "topcoat" type with different characteristics, possibly in register with the underlying decoration.

With these techniques, products that incorporate
25 differential gloss effects in the protective layers of the "topcoat" type are produced.

The underlying covering intended to receive the decoration with a differential gloss effect may be smooth, embossed by chemical or mechanical graining, and may be in
30 a flexible or rigid form.

The decoration on the underlying covering may be printed, made by inclusions of materials (inlaid) or even obtained by other standard techniques. The products may especially be produced on standard equipment for producing
35 floor coverings, up to a width of 4 m or more.

The nature of the covering may consist of synthetic materials such as PVC and polyolefins, semisynthetic materials of the linoleum type, and may also be laminated products or wood.

5 A first continuous or discontinuous application of a first protective layer is first achieved on the chosen underlying covering, followed by a drying operation.

10 A second discontinuous protective layer with a matting effect that is different from that of the first layer is then applied.

If so desired, the second layer may partially overlap the first layer if it is discontinuous. There will necessarily be such a partial overlapping when the first layer is continuous.

15 Complementary matting effects (for example intermediate between the glossiest layer and the mattest layer) may be obtained either following the partial overlapping of the first and the second layer, or by applying one or more additional protective layers.

20 After each application of a protective coating layer, a drying operation is performed. The drying may be performed either using hot air or by IR-irradiation.

25 After drying, a curing operation is also performed, preferably under irradiation with UV or with a beam of electrons.

The differential gloss applications may or may not be in register with the actual decoration of the covering and/or may or may not be in register with the embossments of the product.

30 The degree of gloss of the protective layers with differential gloss effects may range between 5 and 90 (under 60 degrees).

The thickness of the layers thus applied may range from 3 to 50 µm.

35 The application of the various protective layers of

differential gloss may be performed by means of one or more of the following techniques (of course taking into account the fact that it may be desired to produce the first protective layer optionally in a continuous way):

5 - air knife;
 - screen-printing application;
 - heliographic application;
 - flexographic application;
 - roller coater.

10 In addition to their specific gloss characteristic, the applied layers may also be coloured.

As will be described in greater detail hereinbelow, the recommended technique allows to create mat-gloss contrast effects with two or more than two different grades 15 of gloss.

The chosen protective layers contain coloured or uncoloured resins that are conventionally used as topcoats, so as to apply one layer of specific gloss contrasted with the gloss of a neighbouring layer.

20 In contrast with the "kiss-coating" techniques, the recommended technique also allows to coat both the depths and the crests of the embossment.

25 The resin contained in the protective layers is chosen among standard curable resins, in particular resins that are curable with UV or with a beam of electrons, which may be chosen from the group consisting of the following resins: polyurethane, melamine, epoxy, acrylic or modified ionomer, etc. Heat-curable resins may also be suitable, although they are more difficult to use. The incorporation 30 of matting agents into such compositions does not essentially reduce, and may even improve, the intrinsic wear resistance properties, thus affording a very wide range of techniques and products for the implementation of the method.

35 The invention will be described in greater detail with

reference to an illustrative embodiment and to examples for implementing the technique of the invention, with regard to the attached drawings.

5 Brief description of the drawings

Figure 1 illustrates the operating steps of a production line of the product according to the invention.

10 Figure 2 diagrammatically illustrates a cross-section of a flat product obtained by a continuous method according to a first embodiment.

Figure 3 corresponds to Figure 2 for a second embodiment.

15 Figure 4 differs from the two preceding figures essentially in that it relates to a product that is embossed and also continuously produced.

Figure 5 diagrammatically illustrates a cross-section of a product of the "wooden parquet flooring" type produced by a discontinuous method.

20 In the various figures, identical reference numerals are used for identical or similar constituent elements of the products obtained.

Detailed description of one preferred embodiment of the invention

25 The manufacturing line that is schematically shown in Figure 1 involves the following operating steps:

- standard manufacture of the support 1;
- first application 2 of a polyurethane resin;

30 This application may be performed practically by any common technique, by air-knife coating, by coating with a roller, or alternatively by screen printing, heliography or flexography;

- drying 3. It is possible to dry using hot air and/or using an IR-heating installation;
- curing 4. The usual UV or electron-beam techniques are

suitable for this purpose;

- second discontinuous application 5 of a polyurethane resin by heliography or flexography;
- drying 6 especially using means identical to those of step 3;
- curing 7, especially using means identical to those of step 4;
- third optional discontinuous application 8 of a polyurethane resin.

It should be noted that the reference to polyurethane is illustrative and that other resins or resin compositions, in particular resins that are curable with UV or with a beam of electrons, may be suitable.

In Figures 2 to 5, the common reference numerals 10 generally designate a composite underlayer, the reference numeral 20 designates a first "topcoat" layer which may be continuous or discontinuous, depending on the case, and which corresponds to the first application 2 in Figure 1, the reference numeral 22 designates a second "topcoat" layer, which is necessarily discontinuous and which corresponds to the second application 5 in Figure 1, and the reference numeral 24 designates a second "topcoat" layer corresponding to a third (optional) application 8 in Figure 1.

In the case of Figures 2 and 3, the underlayers 10 may, for example, comprise a glass film 11 impregnated with foam 12, a compact layer 13 and a standard wear layer 14.

This type of flat support 10 receives, in the case of Figure 1, a continuous layer 20 of mat polyurethane, a discontinuous layer 22 of high gloss and a discontinuous layer 24 of intermediate gloss.

Figure 3 differs from Figure 2 in that the layer 20 is discontinuous, the layers 22 and 24 nevertheless overlapping the gaps in the application of the layer 20.

In the case of the embossed product of Figure 4, the

foam layer 15 has undergone a standard differential foaming operation according to the "cushion-floor" technique. The wear layer 14 follows the embossment, without filling it, by means of a suitable and standard technique for applying such wear layers onto embossed products.

By these same techniques, a first "topcoat" layer 20 is continuously applied while preserving the embossment.

Layers 22 and 24 are then applied, for example solely on the crests for 22 and in the depths and on the crests for 24. Given that the layer 20 is continuous, it is possible, as in the right-hand part of Figure 4, to leave a space between the layer 24' and 22', both on the crest and in the depth created by the layer 20, if so desired.

The case of a wooden parquet flooring according to Figure 5 differs from Figure 1 only in the nature of the underlayer 10, which is a composite material formed from a bottom layer 16, an intermediate layer 17 and a sheet (strip) of wood 18.

20 Illustrative embodiments

The formulations of the compositions used in the various examples are as follows.

<u>Formulae</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
-Aqueous base aliphatic polyurethane ^a	100	100	100	-	-	-
-Aliphatic acrylate polyurethane ^b	-	-	-	100	100	100
-Tripropylene glycol diacrylate ^c	-	-	-	40	40	40
-Antifoam ^d	0.2	0.2	0.2	-	-	-
-Wetting agent ^e	0.2	0.2	0.2	0.2	0.2	0.2
-Viscosity modifier ^f	0.5	0.3	0.2	-	-	-
-Matting agent ^g	-	2	3	-	2	4
-Photoinitiators ^h	2	2	2	-	2	2

These constituents are sold under the trade names or brand names below by the manufacturers indicated.

a.	Neorad R450	Zeneca
b.	Ebecryl 294	UCB
c.	TPGDA	UCB
d.	Byk 022	Byk Chemie
5 e.	Byk 346	Byk Chemie
	Fluorad FC 430	3M
f.	Coatex Rheo 2000	Coatex
g.	Acemat + s 100	Degussa
h.	Irgacure 184	Ciba

10

Example 1 (flat product according to Figure 2)

The support is manufactured according to the standard techniques that are well known to those skilled in the art.

15 The first PU (formula C) is continuously applied onto the support using a roller coater (thickness 10 microns/mat effect 15). The PU is dried with hot air.

The second PU (formula A) is then applied by the heliographic technique (thickness 10 microns/gloss 80). The PU is again dried with hot air.

20 The third PU (formula B) is applied by heliographic roller in register with the design of the second PU (thickness 10 microns/gloss 50). Drying with hot air.

The third PUs are finally cured under UV (power 160 W/cm).

25

Example 2 (flat product according to Figure 3)

First PU (formula C) is applied by heliographic roller (thickness 10 microns/mat effect 15). Drying with hot air.

30 The second PU (formula A) is applied by helio in register with the first PU (thickness 10 microns/mat effect 80). Drying with hot air.

The third PU (formula B) is applied by helio in register with the first and the second PU (thickness 10 microns/mat effect 50). Drying with hot air.

35 Final UV-curing.

Example 3 (embossed product according to Figure 4)

First PU deposit (formula F) continuously applied by heliographic roller (thickness 10 microns/mat effect 15).

5 The PU is then UV-cured.

The second PU (formula D) is then applied by helio (thickness 10 microns/gloss 80). UV-curing.

10 The third PU (formula E) is applied by helio in register with the second PU and in register with the design of the joint (thickness 10 microns/mat effect 50). UV-curing.

Final UV-curing.

CLAIMS AMENDED FOLLOWING THE PCT WRITTEN OPINION

1. Floor and wall coverings with a differential gloss decoration effect, comprising an underlying covering (10) comprising synthetic materials such as PVC and polyolefins, or semisynthetic materials of the linoleum type, characterised in that said underlying covering (10) is protected by at least two protective layers (20, 22, 24) of a thickness from 3 to 50 µm and of different matting effect, said protective layer comprising polyurethane applied by heliographic roller, possibly in register with the underlying decoration or embossment , and in that said protective layers create a differential gloss effect ranging from 5 to 90 (under 60 degrees).
- 15 2. Coverings according to Claim 1, characterised in that the resin contained in said protective layers is chosen in particular among the resins, which may be cured with UV or with a beam of electrons, of the group consisting of the following resins: polyurethane, melamine, epoxy, acrylic or modified ionomer.
- 20 3. Method for producing floor and wall coverings with a differential gloss decoration effect, comprising the production of an underlying covering (10), characterised in that gloss effects are produced by differential applications (20, 22, 24) comprising a first layer (20) and a second layer (22, 24), said first layer being discontinuously applied onto said support (10) and then dried, said second layer (22) and/or (24) intended to partially or totally cover the first layer (20) of 25 different matting effect being discontinuously applied without total overlapping of at least two protective layers of different characteristics, possibly in register with the underlying decoration and/or with the embossment of the 30

product, the degree of gloss of said protective layers with differential gloss effects ranging between 5 and 90 (under 60 degrees) and the thickness of the layers thus applied ranging from 3 to 50 µm.

5 4. Method according to Claim 3, characterised in that said underlying covering intended to receive the decoration with a differential gloss effect is smooth or embossed by chemical or mechanical graining, and is in a flexible or rigid form.

10 5. Method according to Claim 3 or 4, characterised in that the decoration on the covering underlying the differential protective layers (20, 22, 24) is printed and/or made by inclusions of materials (inlaid).

15 6. Method according to any one of Claims 3 to 5, characterised in that complementary matting effects are obtained either following the partial overlapping of the first (20) and the second (22) layer, or by applying one or more additional protective layers (24).

20 7. Method according to any one of Claims 3 to 6, characterised in that, after each application of a protective layer, a drying operation is performed using hot air or by IR-irradiation.

8. Method according to any one of Claims 3 to 7, characterised in that said protective layers are coloured.

25 9. Method according to any one of Claims 1 to 8, characterised in that the application of the various protective layers of differential gloss is performed by at least one discontinuous technique chosen from the group:

- air knife;
- screen-printing application;
- heliographic application;
- flexographic application;
- roller coater.

3

10. Method according to Claim 9, characterised in that the various protective layers are applied during a manufacturing step that is separate from that of the underlying support (10).

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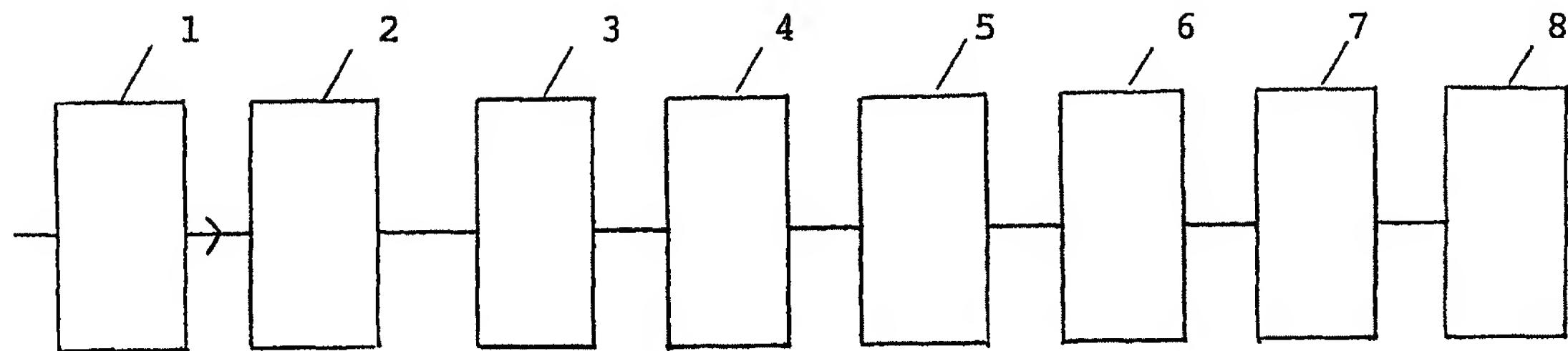


FIG. 1

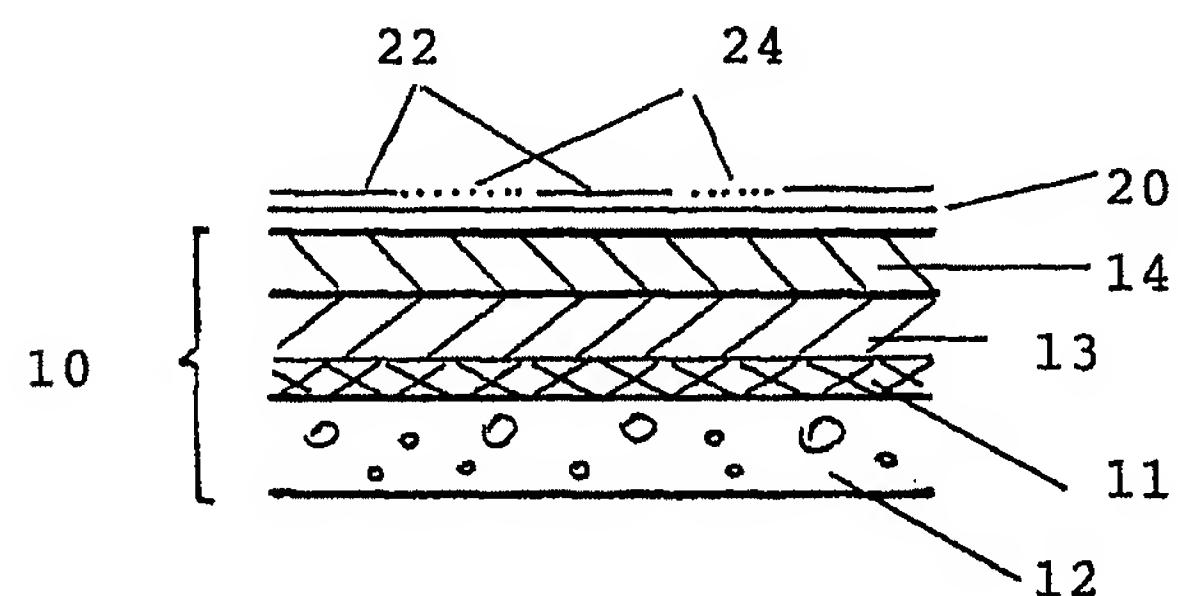


FIG. 2

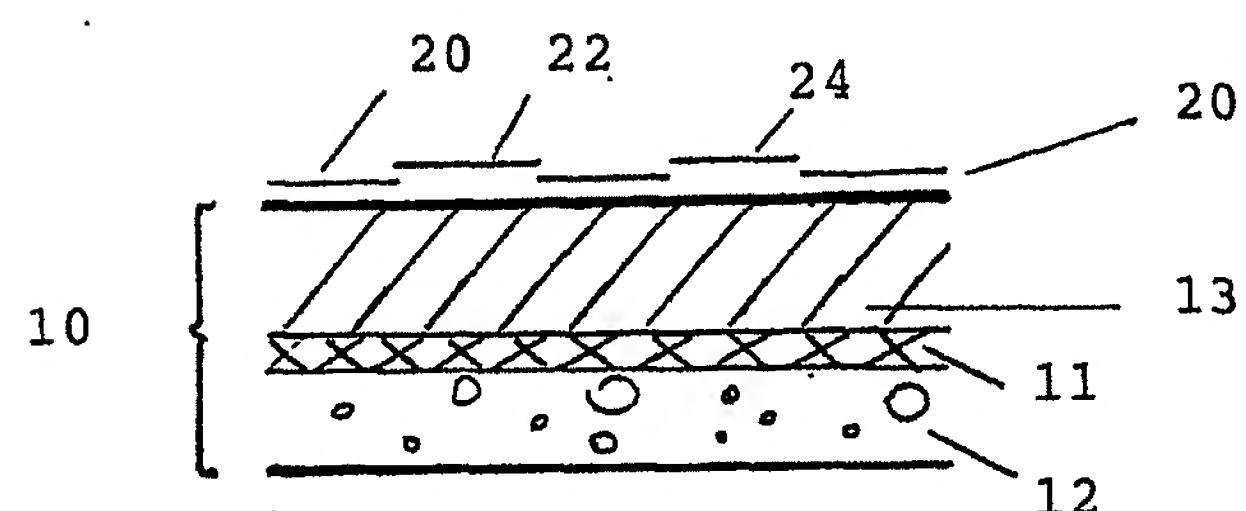
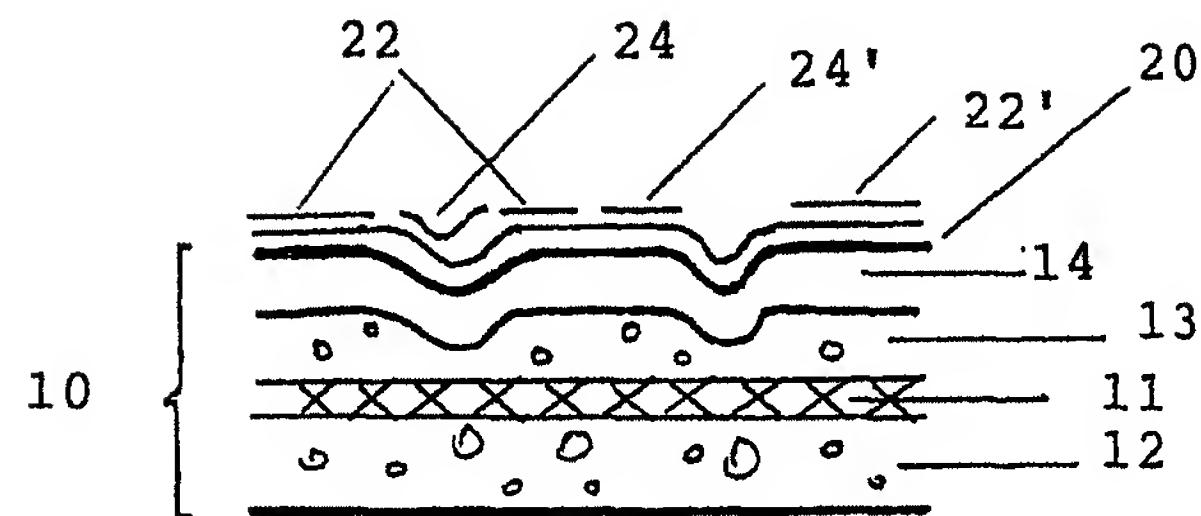
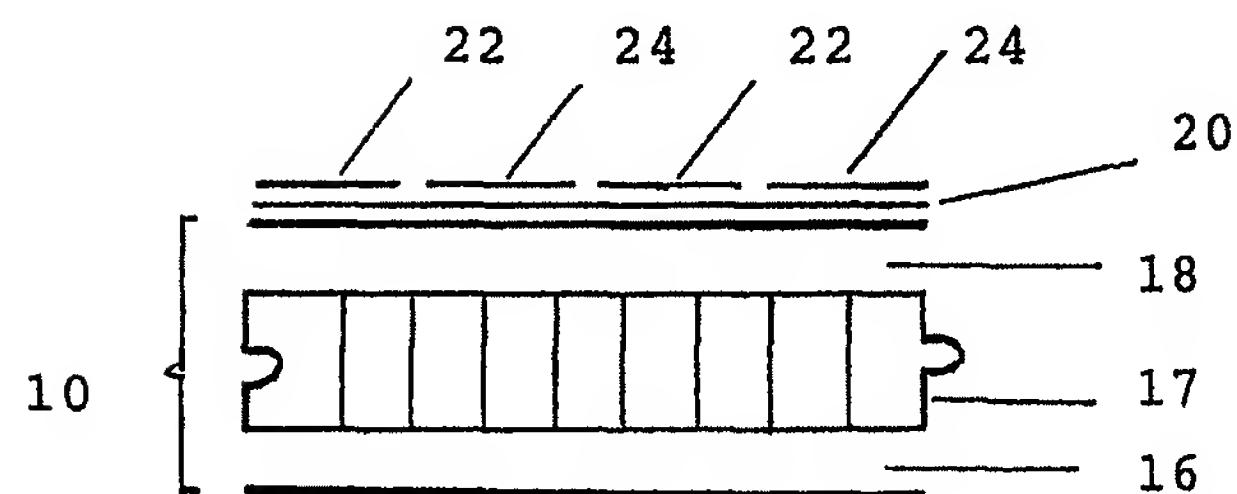


FIG. 3

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FIG. 4FIG. 5